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An Evaluative Study of the Defense Mechanism Test

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An Evaluative Study of the Defense Mechanism Test

1. The Defense Mechanism Test: Development and Theoretical Framework

1.1. Introduction

On the occasion of the Meeting of the British Association for the Advancement of Science in Liverpool in 1982, reports appeared in the British press on a test which, according to its Swedish authors, makes it possible to pinpoint accident-prone pilots before they ever enter the cockpit of an airplane. To illustrate the strength of the test's prognoses, it was reported that in Sweden, 14 of 229 prospective pilots in a training group died in airplane accidents. In the results of this test, so the report, increased accidentprone-ness was clearly shown for 13 of these 14 pilots. Since application of this test in the selection of prospective pilots, the report continues, the drop-out rates in trainees had so greatly decreased that in Sweden since only half the previous number of persons need to be trained in order to reach the same number of pilots. On the other hand, the British Ministry of Defense had rejected this test as an instrument of selection in the Royal Air Force. It is understandable that not all agreed with this decision.

So much for the debate in the newspapers. The test, about which such wonderful claims were made, is called the Defense Mechanism Test (DMT) and was developed in Sweden about thirty years ago. In view of the number of publications that exist on the test, it does not seem to be very well-known outside Sweden. In *Buros* - the so called "Yearbook" on tests published - it is futile to search for a description of the test. As its name indicates, the test should measure defense mechanisms in the Freudian or Neofreudian sense. This paper attempts to bring together and examine information available on the DMT and thus to gain a basis allowing critical evaluation of the test.

1.2. History of Development and Theoretical Framework of the Test

The Defense Mechanism Test (DMT) was developed by Ulf Kragh in the 1950's. At that time, Kragh was part of a group of young psychologists at the University of Lund, Sweden, which was greatly inspired in its work by the "new look of perception", the research surrounding the Leipziger Gestalt psychologist F. Sander. The "new look of perception" movement can be viewed as a reaction to classical perceptual psychology, in that it raised the following question: "Where, in the theory of perception, has the person of the perceiver gone to?"

In the early fifties, Kragh, Lund and others developed at the University of Lund the "percept-genetic model of perception personality". This model includes the assumption that there is a parallel between the ontogeny of a individual and his percept-genesis, which is the Lund researchers' term for the actual genesis of a percept. With other

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words: the experiences of the individual ontogeny are reflected in the perceptgenesis of this individuum. This would apply especially to his psychosexual development in the sense of Freud's psychoanalytic theory.

Experiments using tachistoscopically-presented TAT pictures convinced Kragh that the individual's defense mechanisms can be tapped in percept-genesis, if appropriate stimuli are chosen.

With this background, Kragh developed, in succeeding stages, the Defense Mechanism Test, which in its current form is said to make possible a systematic assessment of the defense structures of both normal, neurotic and psychotic individuals. The test is based upon the following: from the percept-genesis of two pictures shown to the subject tachistoscopically with increasing exposure time, the defense structure is assessed. Following each exposure, the subject tells the experimenter what he has seen and draws a sketch. In general, the subject is not conscious of the fact that he is repeatedly presented with the same picture, as he perceives something different each time. The subject's reports are subsequently analyzed in terms of the degree to which they deviate from the picture presented. Some of these deviations are interpreted as indications of defense.

Kragh distinguishes ten main groups of indicators of defense, and the names of the groups correspond more or less to the defense mechanisms described by S. Freud and, later, A. Freud, namely: repression, isolation, denial, reaction formation, identification with the aggressor, turning against the self, two forms of introjection, projection and regression. Delimitation of the different indicators and their assignment to the particular defense mechanisms is done mainly according to their phenomenological similarity to the defense mechanisms as described by the psychoanalysts.

The rationale behind the claim that the DMT is an appropriate aid to selecting persons for a stressful occupation is given as follows: defense mechanisms bind a considerable amount of psychic energy, which under stress conditions is no longer available for coping with reality. In addition, defense mechanisms prevent adequate testing of reality in danger situations.

1.3. Test material and Administration

The DMT may be administered as a group test or to individuals. As Kragh today recommends only the individual test form, only this will be described - as explained in the 1985 test manual (Kragh, 1985).

Description of the test instrument

Equipment: DMT tachistoscope

The tachistoscope is especially designed for the Defense Mechanism Test.

The pictures are placed in a cassette which is then inserted into the instrument. Exposure time can be selected either automatically or manually. Pictures are changed by simple rotation of the cassette.

Materials to be used during the test: pictures, test-record, pencils.



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There is a total of six pictures in one cassette. Picture 1 is an eye-chart which is used to check the sight of the test-subject with and without glasses (where applicable). It is sufficient if the four upper rows of the chart can be read correctly. Picture 2 is a demonstration picture that is shown once while the instructions are being read. Pictures 3 and 4 are two distractors which are shown before, during, and after the actual test pictures, in selection test, or just after (Picture 4), in clinical testing. There are two threat pictures, two for male subjects and two for female subjects. First, the picture with a central figure sitting at a table is shown, then the picture with a central figure kneeling.

Instructions for the DMT

Begin with the question, "Have you heard about the DMT?" If the answer is "yes", ask "What have you heard?" (Note any response on the front of the Report Booklet.)

1. (Primary Instructions)

"I shall show you pictures in this viewer (investigator points). Each picture will be visible for only a moment, so it is important to remain attentive. As soon as I say 'ready' - but not before - you are to lean forward and look into this viewer. There you will see shining spots in each of the four corners. You are to focus your eyes midway between these spots. This is where the picture will be projected. A few seconds after I have said 'ready', I will say 'now' and I will then project a picture."

"In a moment I will show you a picture as an example of what you will be looking at, but first let's test your vision to see if you need your eyeglasses or not" (when applicable). Look into the viewer. Is the height comfortable for you?" (If not, adjust it.) "Do you see the shining spots?" (Picture 1 - Eye-chart - is shown full time.) "Can you read the four upper rows?... That's fine..."

(Picture 2 - the "Demonstration picture" is rotated into place and the test time is set at stop 14.)

"Now we will look at the demonstration picture. Can you see between the shining spots? Are you ready?... Now!... What did you see? ... Did you see anything else? ..." (The investigator answers only, "I see, that's fine.")

"Your task now is to tell me what you saw. You're not expected to be absolutely sure, no one could be sure in so short a time. The important thing is that you try to relate your impressions. Just try to be sensitive to them. The pictures sometimes change only a little during the time between one viewing and another, sometimes they change a lot. But, after each picture, tell me what you have seen."

"After each viewing you are also to draw a simple sketch so that we can get an idea of where in the picture the things were that you saw. Your drawing may be very simple - your drawing skills are not being tested. Here is a booklet with a number of boxes for you to draw in." (Open the booklet and point to the specific order in which the drawings are to be made.)

"When I have shown you a picture, you are to begin drawing immediately and, at the same time, tell me what you saw. I will write down what you say (when applicable: "and I will also tape record your account"). Do you have any questions? ... Each time I present

a picture I say 'ready' in advance, and then I say 'now' just before the presentation. Then, let's begin... Ready... Now."

2. Secondary instructions (only for selection tests).

When the test-subject reports for the first time having seen a person in the threat series, the investigator gives the following instructions:

"As we go on, I want you to indicate three things every time you see a person in each of the following pictures. First of all, you are to tell me the sex of the person, then you are to guess an approximate age, and thirdly, you are to judge the person's state of mind."

"You are to mark your answers beside the person's face in your drawing, using the following abbreviations:

- 1) M for man, W for woman, and Pe for person, if you are unable to determine the sex.
- 2) Then you are to write down the age, or, if you can't make a guess, note a '?' (question mark).
- 3) Finally, you are to approximate the person's state of mind, noting '+' (plus sign) for positive, '-' (minus sign) for negative, and 'O' for neutral.

If you are unable to determine any state of mind, mark a '?'. An example of your notations could read: Pe 30 O, which would indicate that you saw a neutral person of approximately 30 years of age."

Recording the test-subject's report.

Recording the test-subject's report while a picture is being exposed proceeds in the following manner: the test-subject relates his/her observations and, at the same time, draws a sketch in the Response Booklet (protocol B). The investigator records the oral responses in the Test Report Booklet (Protocol A). It is recommended that recording time be kept to a minimum so as not to disrupt the continuity of the test. As a rule of thumb, the time between exposures should not exceed 3 minutes. Under no circumstances should it exceed 5 minutes.

1.4. Interpretation of Results: Coding and Evaluation

Interpretation of the DMT is done in two steps: first the coding of the test protocols, and their subsequent evaluation.

Structures and stimuli

Hero (H) denotes the person seen (drawn, marked) by the subject at a position corresponding to that of the central figure in the picture. In cases where the subject in the first phase sees only one person, who is not unequivocally located in the position of the central figure, the person is defined as hero on condition that he/she is not located in the position of the threat figure. The same is true for the following phases as long as only one person is seen.

Peripheral person (pp) or threat person denotes the person(s) or object(s) seen at the place of the peripheral, threatening figure.

The instrument (instr) is the object being used or held by the hero and which is seen in the place of the central figure's attribute.

The Ten Main Indicators

1. Repression

Hero and/or pp have a quality of rigidity and inanimateness or of being masked, or are animals (also concerns instr).

2. Isolation

Hero and pp are separated from each other in the field, parts of the configuration are excluded or "whitened"; parts of the P-phase sequence are excluded.

3. Denial

Existence of threat is denied or made light of.

4. Reaction formation

The threat is turned into its opposite.

5. Identification with the aggressor

Hero is the person attacking or threatening.

6. "Introaggression" (Turning against the self)

Hero or instr are hurt or worthless; instr is a threat to hero.

7. Introjection of the opposite sex

Hero's sex is not that of the central figure.

8. Introjection of another object

Hero is duplicated or multiplied; the identity of the central figure is drastically changed.

9. Projection

Successive and specific changes of hero before pp has become threatening; secondary change of pp via hero.

10. Regression

The total phase structure, or partial structure, breaks down to a structure belonging to an earlier phase level (possibly before P_1).

Evaluation of the Test Protocols

As rules concerning the coding and interpretations have been changed many times in the past decades, it can only be mentioned briefly here that for selection purposes every coded defensive indicator - or sign - is regarded as prognostically more or less negative. The fewer defence signs in the responses, the better the prognosis will be.

2. Reliability of the DMT

With regard to the errors of measurement of a test, we wish to first determine its reliability. That is, we want to determine the accuracy with which the test measures whatever it is that is measured.

Depending on the test, various kinds of reliability are significant. For the DMT, four types of reliability are of main interest:

1. reliability of test administration (recording responses),
2. reliability of coding (assigning responses to given categories),
3. reliability of evaluation of the test protocol (quantification and interpretation) and
4. stability with repeated testing.

2.1. Reliability of Test Administration

Administered to individuals, the DMT can be regarded as well-standardized. If the instructions in the manual are followed, we can assume that errors of measurement due to varying test conditions are reduced to a minimum. The disadvantages of the group test form (as, for example, different angles of vision according to the position of the subjects in reference to the screen, or disturbing influence of fellow subjects) have led to the fact that this form of administration of the test is no longer recommended.

However, the question remains open as to whether age and gender of the test administrator affect test results. Because the stimulus and distracting pictures are meant to activate oedipal anxiety and defense against it, it can be assumed that if the administrator of the test is of the same gender as the subject and approximately the age of the subject's parents, these intrapsychologic processes will be more intense than if the administrator is close in age to the subject. Since effects of the current psychic situation of the subject on DMT test results have not received much consideration up to now, it seems that influences by the test administrator have never been examined as well.

2.2. Reliability of Coding

A thoroughly conceived, clear, and in contrast to other projective tests, objective evaluation system is repeatedly mentioned in the literature as a distinct advantage of the DMT, as nearly no interpretation of test responses need take place in the coding phase. It is all the more astounding that in the literature we find only one precise statement (Westerlundh 1976) on the degree to which coding of different coders respond.

The pitfall of Westerlundh's studies lies in the fact that the raters did not independently code Westerlundh's test protocols themselves, but rather simply compared Westerlundh's codings with the original protocols and noted any disagreement they might have. We can assume that in this way coding agreement (96 % of 1550 codes) was overestimated. Evidently, there is a tacit assumption that the coding instructions guarantee reliable coding.

2.3. Reliability of Evaluation

As mentioned, the reliability of total ratings of test protocols has been more thoroughly studied than the reliability of coding. Because there exist evaluation instructions only for the use of the DMT as an instrument of personnel selection, all information pertaining to inter-rater reliability of total ratings comes from studies on the DMT as a selection instrument.

In summary, one can say that although good inter-rater reliability is reached in rating the DMT, this is not a matter of course, but rather is dependent to a considerable extent upon the rater's experience, the type of test administration (individual testing, which yields more exact information vs. group test) and also upon the rating system used. In any case, it would be desirable to have information on the amount of training that a rater should have in order to be able to rate DMT protocols more or less reliably. The creation of a programmed course for raters would be a way to ensure such training.

Further, it has up to now only been shown that there can be good agreement among raters' judgements when the raters are colleagues and come from "the same school". It is yet to be demonstrated that such agreement can be achieved among persons working with the DMT for lengths of time independently of each other.

2.4. Test-Retest Stability of Results

It is especially difficult to determine the actual reliability of subjects' results on the DMT.

We can assess reliability using the parallel-test technique. However, even with retesting of the subject with a comparable form of the test, we must take residue effects into account. As Kragh (1985) reports in reference of the course of the test, subjects' expectations change considerably as early as the first series of pictures, so that percept-genesis of the second stimulus already occurs more rapidly. If further similar stimuli are presented within a short period of time, we must expect a massive increase in this effect. The use of a parallel test with more dissimilar stimuli is also not a practicable option, as in this case results would no longer be comparable. According to Kragh (1985), there is an exception to this rule in the case of individuals who in their case histories show complex patterns of psychological disturbance. Such persons frequently show very stable patterns of defense in the DMT series, which show up when very dissimilar picture motifs or different percept-genesis methods are used.

According to psychoanalytic theory defense mechanisms represent personality characteristics which long remain constant and are very resistant to change, retesting with a parallel test after longer intervals should lead to similar results, if the test measures reliably. If the subject has not, in the meantime, undergone any form of therapy or therapeutical experience, then we would expect no change in the construct to be measured. The test manual (Kragh, 1985) reports on a study in which a small group of Swedish pilots ($N=15$ and $N=20$) was retested with a parallel version of the DMT one and five years later (Neuman, 1967, in Kragh 1985). Stability of the subjects' ratings on the nine-step scale and stability of individual defense indicators were calculated. After one year, a stability of ratings of $\rho=.81$ was determined; after a five year interval $\rho=.53$ was found. These impressive parallel-test reliabilities after one and five years in Neuman's study needs to be confirmed through further studies with larger samples and neutral scientists.

3. *Validity of the DMT*

In terms of the validity of the DMT, two main issues come into the foreground: First, we need to know if the test actually does measure defense in the psychoanalytic sense, because there exists no generally accepted and tested theory within psychology which states that perceptual distortion under difficult perceptual conditions is caused by defense processes.

More or less independently of this first issue, it is also of interest to determine how well the DMT does the job for which it is designed and used - in particular, if it proves its worth as a prognostic and diagnostic instrument. This is the issue of criterion validity.

3. 1. *The DMT as an Instrument of Selection of Air Force Pilots*

Since its design in the 1950's, the DMT's main area of application has been the selection of pilots, or, more precisely, the selection of air force pilots. The Royal Swedish Air Force uses the test in the selection of prospective pilots, as do the Danish and Norwegian armies. In Great Britain, a few trials have been made with the test. Other European countries also seem interested in the DMT. The first question is, therefore, how suitable an instrument the DMT is in the selection of army pilots.

The earliest studies on this issue were done on prospective pilots of the Royal Swedish Air Force in the years 1957 and 1958, after Kragh, on the basis of the test results of two previous flight cadet groups (Autumn 1956 and Spring 1957), had designed and partly validated test coding (Kragh, 1960). Table 1 shows the validity-coefficients found in this study and in further Swedish and Danish investigations. Most of these coefficients are so high that one would agree with Neuman's conclusion in connection with the better training results of pilots of the Royal Swedish Air Force (Neuman, 1978,4): "The conclusion of this investigation is that the DMT results in general, and as validated by Norm 78 in particular, are suitable for predicting success of military pilots."

However, Table 1 contains only those investigations in which the test authors Kragh and Neuman were themselves involved. Because the test is also used in the selection of pilots in other European countries, it is interesting to see how good the test's prognoses are there.

Unfortunately, very few reports on other countries' experience with the DMT have been published. For this reason, the small amount of information available on the prognostic validity of the DMT when not being used by its own authors becomes especially important.

Table 1: Predictive validities of the DMT in pilot selection
[as presented by Kragh in the DMT-Manual (1985)]

Author	Category	Rater	N	Coeff. validity	P<	Criterion
Kragh 1960	Swedish pilots without college 1957 - 1958	A	146	$r_{bi} = .47$	.001	Pass-fail
		B	42	$r_{bi} = .33$	.40	Pass-fail
Kragh 1960	Swedish pilots with college	A	74	$r_{bi} = .63$	.001	Pass-fail
		B	73	$r_{bi} = .08$	n.s.	Pass-fail
Neuman 1967	Swedish pilots with and without college	J-K	88	$r_{bi} = .35$	.002	Pass-fail
	Same group after five years	J-K	88	$r_{bi} = .52$	.001	Adaptation as pilot
Neuman 1968	Swedish pilots all categories	J-K	116	$r_{bi} = .46$	.0001	Pass-fail
Neuman 1978	Swedish pilots Design group	L-M-N-O	208	$r_{bi} = .68$		Pass-fail
	Same group	L-M-N-O	208	$r_{bi} = .75$		Adapted - not adapted over 6 - 12 years
Neuman 1978	Swedish pilots Control group	J	225	$r_{bi} = .35$		Pass-fail
	Same group	J	225	$r_{bi} = .50$		Adapted - not adapted over 6 - 12 years
Neuman 1978	Danish pilots Control group	R	84		n.s.	Pass-fail
Termöhlen & Johansen 1980	Danish pilots Control group	R	99	$\emptyset = .42$	.001	Pass-fail

Table 2 shows validity-coefficients reported by Stoker (1982) on trials made in Great Britain on using the DMT in the selection of pilots. According to Stoker, the great differences between these validity-coefficients and those found by Kragh or Neuman can not be sufficiently explained by mistakes in administration or evaluation of the test in the British investigations.

Table 2: Predictive validities of the DMT in pilot selection
[Results of the investigation of Stoker (1982) with pilots of the British Royal Air Force]

Author	Category	Rater	N	Coeff. validity	P<	Criterion
Stoker 1982	British pilots	S-T	50	$r_{bi} = .19$	n.s.	Pass-fail in Basic Flying Training
	Same group	S-T	50	$r_{bi} = -.26$	n.s.	Pass-fail in Tactical Weapons Training Unit
	British Pilots cross-validation group	S-T	128	$r_{bi} = .07$	n.s.	Pass-fail in Basic Flying Training

Stoker reports in his 1982 publication on trials made in Great Britain on using the DMT in the selection of pilots. For the first time in 1977, 50 flight cadets were tested with the DMT group test at the onset of their 18-month-long basic flight training. Use of the individual testing form had seemed too costly. It was desired, first of all, to find out if it were possible to replicate Sweden's results. If with the group test a prognostic validity of 0.2-0.3 were reached, this would serve as an indication that it would be worthwhile to use the costly (in terms of time and personnel) individual version.

The Swedish weightings were used on the raw score of the coded protocols. As systematic differences between the two populations could not be ruled out, the weighted values for the ten main indicators were standardized in z values, and for each subject the mean of the ten main indicators was calculated. Using these standard values, point biserial correlations with the two criteria "pass/fail basic flight training" and "pass/fail tactical weapons training" were calculated. The distribution of weighted values, in addition, was divided into five categories, and the frequency of passing/failing flight trainees in these categories were analyzed using X.

Results for the first criterion seemed encouraging to the authors. The distribution of "failing" over the five DMT categories was as expected: the percentual proportion of failings increased from the best to the worst category ($X = 10.03$, $df=4$, $p<0.001$). A point biserial correlation of 0.19 was found between standardized DMT values and this criterion. For the second criterion, success in the more demanding tactical flight training, results were not as good. Successful completion of training did increase continuously from the worst to the best DMT categories, but the distribution of "failing" was less consistent, and the X test yielded no significant correlation. The point biserial correlation with this criterion was -0.26.

As a next step, these first results were cross-validated on a second sample of flight

cadets. At the time of Stoker's publication, 128 persons in this second sample had completed their basic flight training. This group showed absolutely no systematic trend in the distribution of passing or failing training over the five DMT categories. The point biserial correlation with this criterion "successful completion of basic training" was practically null (0.07). In order to be sure that this result was not simply due to inappropriate application of Swedish weightings of the DMT values to the population of English flight cadets, discrimination analysis was performed on the DMT raw scores. But here no combination of values could be found which would reliably differentiate between successful and non-successful pilots. According to Stoker, miscellaneous mistakes in administration or evaluation of the test can not sufficiently explain this result.

It is interesting here that Neuman, in his dissertation in 1978, found no significant correlation between successful completion of basic flight training and DMT results in a group of 84 Danish prospective pilots, whereas correlation with the same criterion in a sample of Swedish pilots was found of $r_{bi}=.35$. This is all the more surprising as the DMT was administered as an individual test to the Danish pilot candidates (unlike all other investigations discussed here), which, according to Kragh, should result in more reliable results.

3.2. Prognostic Validity of the DMT for Other Dangerous Occupations

As mentioned, the DMT was initially used mainly as an instrument of selection in the selection of pilots. Justification for this application of the test lay in the idea that defense mechanisms absorb a not inconsiderable portion of psychic energy. Thus, in the presence of many defense mechanisms, there are less mental resources available to the person for coping with stress situations, such as those which can arise when flying a fighter plane. These considerations made it seem reasonable to test the use of the DMT in all areas where impairment of mental performance capacity in critical situations could be expected to have fatal consequences.

In sum, we do not find much correspondence among the results of investigations on the applicability of the DMT as an instrument of selection in areas other than pilot selection. It is striking that the 5 and 9 step rating scale, which in part yielded quite good prognoses in the selection of pilots, are of little significance in these studies. As we have seen, rather, relationships were found with particular defense mechanisms; unfortunately however, these relationships were not always found with the same particular mechanisms! At any rate, it would seem that repression, insulation, reaction formation and cross-gender identification have a certain pre-eminence (whereas some of the remaining six defense mechanisms hardly ever show up and therefore can hardly play a role here).

3.3. Construct Validity of the DMT

The difficult question remains as to whether the DMT actually does measure defense mechanisms as Freud understood them.

Since the DMT was designed, many studies, some very elaborate, have been done addressing this issue. One can say that most studies done in the clinical area have attempted to verify construct validity of the DMT. Not surprisingly, some of the hypotheses made in these could be confirmed and many others had to be rejected. To

illustrate, a recent study by Cooper & Kline (1986) attempted to show construct validity of the DMT through correlations with other personality measures, particularly with Cattell's 16 PF. Based upon psychoanalytic theory, the authors postulated 52 relationships between the ten DMT defense indicators and the other personality measures. Thirty-three of these correlations pointed in the right direction, but more than half of these were smaller than .10 and only five reached significance at a 5% level ($r > .26$). Of the remaining 148 correlations calculated in this study, 68 lay below .10 and nine reached significance at the 5% level. Only five correlations (two of them postulated, three not postulated) were greater than .34, and the strongest correlation was $r = -.44$.

As described in the first part of this paper, the DMT is based upon the following theoretical considerations: each perception develops from stimulation of sense receptors to perception of the stimulus corresponding to reality. This development is based on micro-processes which occur rapidly in normal perception and are mostly unconscious and unnoticed. These micro-processes, however, can be made apparent for example with tachistoscope presentation of a stimulus with increasing length of exposure. It is in these micro-processes that defense mechanisms, among other things, are revealed. These are activated and become apparent when a stimulus is chosen which is threatening to the subject and elicits anxiety. Defense mechanisms, which are activated by anxiety, effect characteristic changes in perception, in that they "get rid" of the threat before threat and anxiety are consciously perceived. Perceived deviations from the stimulus presented, which in some way are connected with the elimination of the threatening aspects of the stimulus, are therefore the work of defense mechanisms.

Thus explain the authors. So far so good, but this means that there may be no perceptual distortions in the case of non-threatening stimuli, as there would be no reason for defense mechanisms to become activated. If such distortions of perception do however appear, then there must be other reasons for their occurrence.

As far as can be seen in the literature, the attempt has been made twice in the history of the DMT to examine what happens when the threatening peripheral person in the DMT pictures is replaced by a most similar figure with a neutral facial expression (Kragh, 1970; Cooper & Kline, 1986). In both studies, it was the intention of the authors to show that pictures of neutral peripheral persons elicit less defense mechanisms. This was to be taken as proof that the DMT actually measures defense. And indeed, some defense mechanisms did appear more frequently with presentation of the threatening peripheral person. One can turn the tables, however, and ask why it is that defense indicators appeared at all in the case of non-threatening peripheral figures, as here there was nothing to defend against!

There is a simple answer to this question: perceptual deviations occurred because exposure to the pictures was so short. It is a commonly familiar phenomenon that at least with very short exposures, perceptual deviations occur in all subjects, especially when new and complex stimuli are presented. The reason for this phenomenon, whatever it may be, is unimportant. Gestalt psychologists, long before Kragh developed his test, studied the process of gestalt-forming in perception using, among other things, tachistoscope stimulus presentation. And although gestalt psychological experiments usually used geometric figures as stimuli, perception of these figures unfolded gradually from rather emotionally-laden inklings to so-called pre-gestalts to a clear, concrete grasp of the figure shown. These unfolding processes were described as non-continuous, but rather as occurring in phases which emerge from one another in a disjointed way (Graumann, 1959). This means that even geometric figures could not be correctly

recognized immediately, but rather developed, just as the DMT pictures, from pre-stages, which deviated from the stimulus shown, to stimulus-adequate perception. It was also shown back then that the course of this developmental process can be influenced by both the momentary state-of-being and by the motivation of the perceiver, as well as by the perceivers' lasting personality characteristics.

Seen in this light, it is naturally not surprising that perceptual deviations occur also with a DMT picture showing a neutral peripheral person, even though we cannot in this case, just as in the case of the perception of geometric figures, attribute this to the work of defense mechanisms.

4. Concluding Discussion

What conclusions can we draw on the Defense Mechanism Test? We began with the success reported with which the test has been used in the selection of pilots for the Swedish Air Force. As we saw in the section on criterion validity, the correlations found in the Swedish Air Force between DMT results and success in basic flight training and in success as a military pilot are truly remarkable. They are higher than we could generally expect for such instruments of selection. And as mistakes in the choosing of military pilots place not only material assets, but also human lives at risk, it would seem irresponsible not to employ the DMT. If we still hesitate to recommend use of the test, it is because, in spite of these good results, the DMT as a whole is not convincing. As discussed in this paper, there remain too many open questions and uncertainties.

Concerning administration of the test, one must ask if it is justifiable to speak of the Defense Mechanism Test, or if there are not rather several Defense Mechanism Tests. First of all, various picture series are and were used in giving the test. Up to now, though, the authors have not presented proof that these various pictures are truly comparable - that is, whether they elicit the same kind and number of defense indicators in a subject.

In addition, sometimes so-called distracting pictures are presented prior to the actual stimulus pictures. The reason for the use of such distracting pictures in personnel selection but not in other settings is mentioned nowhere. In the literature three reasons for the use of distracting stimuli can be found: 1. They are supposed to ensure that all subjects begin the test with the same expectations, 2. They are meant to disguise the fact that otherwise the same pictures are shown again and again, and 3. They are supposed to prevent the subject from remembering the stimulus picture in the case where perceptgenesis is interrupted prematurely, or in other words, when the stimulus should not be recognized completely. There is no apparent reason why these first two points should be of significance only in personnel selection. However, if we examine the content of the distracting pictures ("a couple in bed", or "a reclining woman with a little boy in her lap") and consider the psychoanalytic founding of the test, another explanation for the use of distracting pictures is more obvious: these pictures are meant to elicit oedipal anxiety, which means what they are mainly trying to do in personnel selection is to tap defense against this kind of anxiety. This is also the reason why the masculine/feminine score is frequently used in connection with the ability to cope with stress - a score that represents nothing more than how frequently a (male) subject perceives the hero figure to be female.

Professor N. Dixon of University College in London, a supporter of the DMT, explained the psychological basis of the DMT to journalists, during the debate mentioned at the

beginning of this paper on the use of the DMT in the Royal Air Force as follows:

"Accident-prone trainees fail the test because they alter the sex of the boy holding the violin. For them the threatening image is a father figure, catching the boy masturbating (the violin being a phallic symbol). **Unsuccessful candidates in the test have castration complexes** (emphasis by the authors)." (NN, New Scientist, (16. September) 1982)

And castration complexes, according to psychoanalytic theory, can be traced back to an oedipal situation that has not been overcome. A statement such as this one in New Scientist is not to be found in any scientific publication on the DMT; however, we see traces of this concept again and again. Why do the DMT authors not make a clean breast of it? Do they perhaps fear that these theoretical underpinnings will today no longer be well-received?

Also damaging is the lack of norms for the DMT. As there exist no general norms for the test, it is impossible to compare test results of a particular group to those of a general population. In view of the theoretical background of the test, we would wish to assume that neurotic or psychotic subjects produce more or differing defense indicators than the average in the general population. It would also be interesting to know the range within which DMT protocols of prospective pilots lie. Are their results distributed along the entire range of general population results or do pilot trainees represent a homogenous group in terms of defense mechanisms?

Answers to these questions would allow us to draw conclusions as to the construct validity of the test. We could hardly assume that the test really taps defense mechanisms if persons showing in psychotherapy to have very many or rigid defense mechanisms, for example, did not differ in their test results from persons who, as Freud might have said, are fully able to "love and work". It is of course impossible to establish general norms when a test is administered in ever varying forms. It is not even easy to develop truly comparable forms of relatively simple achievement tests. How can it be assumed that the various pictures of the DMT used up to now are even somewhat "parallel"? According to findings on visual perception of the last 10-15 years, it is more likely to assume that even the slightest, seemingly insignificant variations in a stimulus may have a great influence on preliminary phases in perception.

As we have seen, there are also problems with reliability of the test. It is absolutely unacceptable that in thirty years of the test's application, interreliability of coding has not once been assessed.

In addition to interreliability of coding, interreliability of test results has also not been assessed sufficiently. How reliably does the DMT actually measure? The only findings available on healthy subjects are the constant values which Neuman found in his small samples ($n=15$ and $n=20$) after one and five years. It is hard to believe that in thirty years only two groups of healthy subjects have been tested twice with the DMT. One wonders whether inconvenient results have simply not been mentioned or whether those who have used the test are so convinced of their ideas that they consider thorough empirical examination of them to be unnecessary.

The most serious charge that can be raised against the DMT, however, is the fact that good prognostic validity has only be found by Kragh and Neuman themselves and their associates. In view of the other inconsistencies in the test, this fact does not inspire confidence. And there is also the fact that Stoker's study (1982), the only generally

available study on a larger scale on the application of the DMT in pilot selection not stemming from the DMT authors or their associates, is nowhere mentioned in the test manual (Kragh, 1985). This can hardly be an oversight, as Kragh and Neuman must have been aware that the British Royal Air Force was trying out their test.

One thing is certain: the DMT, because of the results reached in the Swedish Air Force, raises high expectations. These expectations are further strengthened by the way the authors present their results. But it is not advantageous to raise high expectations where they cannot be fulfilled completely. There are too many weak points in the DMT to fulfill these expectations. The authors would be wiser not to omit or disguise these weak areas, but rather to address them themselves and formulate them as open research questions. For the results the test has yielded up to now are, particularly in pilot selection, very promising - but more work is needed before the DMT can be said to have "passed the test".

References

- Cattell, R.B., Eber, H.W. & Tatsuoka, M.M. *Handbook for the 16PF Questionnaire*. Champaign, IL: IPAT, 1970.
- Cohen, A.S. Nutzbarer Sehfeldumfang und seine Variation in Feldsituation. *Zeitschrift für experimentelle und angewandte Psychologie*, 1987, 34, 17-37.
- Cooper, C. *An Experimental Investigation of Freudian Defences*. Unpublished PhD thesis, University of Exeter, Faculty of Science, 1982.
- Cooper, C. & Kline, P. An evaluation of the Defense Mechanism Test. *British Journal of Psychology*, 1986, 77, 19-31.
- Freud, A. *The Ego and the Mechanisms of Defence*. New York, International University Press, 1964.
- Freud, S. *Inhibitions, Symptoms and Anxiety*. Standard Edition, London: Hogarth, 1926.
- Håan, G.S. *Personality Testing of Fast Jet Pilots - An Explorative Study of Defence Mechanism Test and Rorschach*. Forsvarets Psykologiske og Pedagogiske Senter, Oslo, 1988.
- Hentschel, U. & Smith, G. (Hrsg.) *Experimentelle Persönlichkeitspsychologie*. Wiesbaden: Akademische Verlagsgesellschaft, 1980.
- Kline, P. The scientific status of the DMT. *British Journal of Medical Psychology*, 1987, 60, 53-59.
- Kragh, U. The Defense Mechanism Test: A new method for diagnosis and personnel selection. *Journal of Applied Psychology*, 1960, 44, 303-309.
- Kragh, U. *Defense Mechanism Test, DMT Manual*. Stockholm: Persona, 1985.
- Kragh, U. & Smith, G. *Percept-Genetic Analysis*. Lund: Gleerups, 1970.
- Neuman, T. *Personlighet och anpassning till militär flygning. Försvarsmekanismer som stabila personlighetsstrukturer. Två studier över DMT-seriers reliabilitet*. Stockholm: MPI-rapport 52, 1967.
- Neuman, T. *Dimensionering och validering av perceptgenesens försvarsmekanismer. En hierarkisk analys mot pilotens stressbeteende*. FOA rapport C 55020-H6, Stockholm: Forsvarets Forskningsanstalt, 1978.
- N.N. Freudian slip reveals accident-prone pilots. *New Scientist*, 1982, 95, 750-751.
- Sjöberg, L. Värdet av DMT vid urval av flygförare. *Nordisk Psykologi*, 1981, 33, 241-248.
- Smith, G., Kragh, U. & Hentschel, U. *Perzeptgenetische Verfahren: Historische und methodologische Übersicht*. In: Hentschel, U. & Smith, G. (Hrsg.) *Experimentelle Persönlichkeitspsychologie*. Wiesbaden: Akademische Verlagsgesellschaft, 1980.
- Stoker, P. An empirical investigation of the predictive validity of the Defence Mechanism Test in the screening of fast-jet pilots for the Royal Air Force. *Projective Psychology*, 1982, 27, 7-12.
- Termøhlen, J. & Johansen, O. *Om anvendelsen af Defence Mechanism Test (DMT) som prognostisk instrument i forbindelse med antagelse af flyveelever till Flyvevåbnet*. Copenhagen: Danish Military Psychological Service, 1980.
- Westerlundh, B. *Aggression, Anxiety and Defence*. Lund: CWK Gleerup, 1976.

Appendix: A Structured Bibliography on the DMT

1. General synopsis on the DMT

Hentschel, U. & Smith, G. (Hrsg.) **Experimentelle Persönlichkeitspsychologie**. Wiesbaden: Akademische Verlagsgesellschaft, 1980.

Kline, P. Assessment in psychodynamic psychology. In: Kline, P (Ed.). **New Approaches In Psychological Measurement**. London: Wiley, 1973.

Kragh, U. **Defense Mechanism Test, DMT Manual**. Stockholm: Persona, 1985.

Kragh, U. Types of pre-cognitive defensive organization in a tachistoscopic experiment. **Journal of Projective Techniques**, 1959, 23, 315-322.

Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970.

Smith, G., Kragh, U. & Hentschel, U. Perzeptgenetische Verfahren: Historische und methodologische Übersicht. In: Hentschel, U. & Smith, G. (Hrsg.). **Experimentelle Persönlichkeitspsychologie**. Wiesbaden: Akademische Verlagsgesellschaft, 1980.

2. On the theoretical foundations of the DMT

Andersson, A.L. Cognitive growth, psychoanalytic conceptions of the mind, aftereffect experience and disavowal as a defense against perceptgenetic threat. **Archiv für Psychologie**, 1983, 135, 103-114.

Dixon, N.F. The conscious-unconscious interface: Contributions to an understanding. **Archiv für Psychologie**, 1983, 135, 55-66.

Draguns, J.G. Why microgenesis? An inquiry on the motivational sources of going beyond the information given. **Archiv für Psychologie**, 1983, 135, 5-16.

Freud, A. **The Ego and the Mechanisms of Defence**. New York: International University Press, 1964.

Freud, S. **Inhibitions, Symptoms and Anxiety**. Standard Edition, London: Hogarth, 1926.

Graumann, C.-F. Aktualgenese. Die deskriptiven Grundlagen und theoretischen Wandlungen des aktualgenetischen Forschungsansatzes. **Zeitschrift für experimentelle und angewandte Psychologie**, 1959, 6, 410-448.

Holmes, D.S. Reduced recall after ego threat: Repression or response competition? **Journal of Personality and Social Psychology**, 1969, 13, 145-152.

Kragh, U. Defensive organization in percept-genesis. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 105-117.

Kragh, U. Subliminal Gradation in the visual field. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 122-127.

- Kragh, U. Spatial and defensive organization at the tachistoscopic presentation of subliminal and incongruent stimuli. In: Kragh, U. & Smith, G. (Eds.). **Percept- Genetic Analysis**. Lund: Gleerups, 1970, 128-133.
- Linschoten, J. Aktualgenese und heuristisches Prinzip. **Zeitschrift für experimentelle und angewandte Psychologie**, 1959, 6, 449-473.
- Wagstaff, G.F. The effects of repression-sensitization on a brightness scaling measure of perceptual defence. **British Journal of Psychology**, 1974, 65, 395-401.
- Westerlundh, B. Personal organization of the visual field: A study of ambient to focal reports of threatening stimuli. **Archiv für Psychologie**, 1983, 135, 17-35.

3. On the use of the DMT for the Selection of Pilots

- Kragh, U. The Defense Mechanism Test: A new method for diagnosis and personnel selection. **Journal of Applied Psychology**, 1960, 44, 303-309.
- Neuman, T. **Personlighet och anpassning till militär flygning. Försvars- mekanismer som stabila personlighetsstrukturer. Två studier över DMT-seriers reliabilitet**. Stockholm: MPI-rapport 52, 1967.
- Neuman, T. **Dimensionering och validering av percept-genesens försvarsmekanismer. En hierarkisk analys mot pilotens stress-beteende**. FOA rapport C 55020-H6, Stockholm: Försvarets Forskningsanstalt, 1978.
- Stoker, P. An empirical investigation of the predictive validity of the Defence Mechanism Test in the screening of fast-jet pilots for the Royal Air Force. **Projective Psychology**, 1982, 27, 7-12.
- Termøhlen, J. & Johansen, O. **Om anvendelsen af Defence Mechanism Test (DMT) som prognostisk instrument i forbindelse med antagelse af flyveelever till Flyvevåbnet**. Copenhagen: Danish Military Psychological Service, 1980.

4. The DMT in personnel selection for other stressful professions

- Kragh, U. Predictions of success of Danish attack divers by the Defense Mechanism Test (DMT). **Perceptual and Motor Skills**, 1962, 15, 103-106.
- Sandberg, B. & Bliding, Å. Problems and symptoms in army basic trainees with stress-induced hypertensive reactions. **Journal of Psychosomatic Research**, 1976, 20, 51-59.
- Sandberg, B. & Bliding Å. Duodenal ulcer in army trainees during basic military training. **Journal of Psychosomatic Research**, 1976, 20, 61-74.
- Ursin, H., Baade, E. & Levine S. **Psychobiology of Stress. A study of coping men**. London: Academic Press, 1978.
- Værnes, R.J. The Defense Mechanism Test predicts inadequate performance under stress. **Scandinavian Journal of Psychology**, 1982, 23, 37-43.

Værnes, R.J. & Darragh, A. Endocrine reactions and cognitive performance at 60 metres hyperbaric pressure: Correlations with perceptual defense reactions. **Scandinavian Journal of Psychology**, 1982, 23, 193-199.

Værnes, R., Ursin, H. Darragh, A. & Lambe, R. Endocrine response patterns and psychological correlates. **Journal of Psychosomatic Research**, 1982, 123-131.

5. Research on the Validity of Construct and critical judgements on the DMT:

Andersson, A.L. & Weikert, C. Die Beziehung von Abwehrmechanismen zu der adaptiven Regulation des Spiralnacheffekts bei Erwachsenen. In: Hentschel, U. & Smith, G. **Experimentelle Persönlichkeitspsychologie**. Wiesbaden: Akademische Verlagsgesellschaft, 1980, 182-199.

Cooper, C. **An Experimental Investigation of Freudian Defences**. Unpublished PhD thesis, University of Exeter, Faculty of Science, 1982.

Cooper, C. & Kline, P. An evaluation of the Defense Mechanism Test. **British Journal of Psychology**, 1986, 77, 19-31.

Johnson, M. Dream reports related to percept-genetic defensive organization in the DMT. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 206-214.

Håan, G.S. **Personality Testing of Fast Jet Pilots - Explorative Study of Defence Mechanism Test and Rorschach**. Forsvarets Psykologiske og Pedagogiske Senter, Oslo, 1988.

Kline, P. The scientific status of the DMT. **British Journal of Medical Psychology**, 1987, 60, 53-59.

Kragh, U. Percept-genetic defensive organization with threatening and non-threatening peripheral stimuli. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 118-121.

Kragh, U. Parallelisms between percept-genesis and onto-genesis in subjects with and without loss of father. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 135-150.

Sjöberg, L. Värde av DMT vid urval av flygförare. **Nordisk Psykologi**, 1981, 33, 241-248.

Westerlundh, B. **Aggression, Anxiety and Defence**. Lund: CWK Gleerup, 1976.

6. Research in the clinical sector

Hessle, S. The Defense Mechanism Test: A personality test for studying changes in defense organization and self-identity with clients in psychotherapy. **Interpersonal Development**, 1975/76, 6, 125-140.

Kragh, U. A case of infantile animal phobia in adult percept-genetic organization. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 151-160.

- Kragh, U. Pathogenesis in dipsomania. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 160-178.
- Kragh, U. An analysis of aggression and identification in young offenders by the study of perceptual development. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 190-199.
- Kragh, U. & Johnson, M. A study of the religious personality by means of percept-genetic techniques. In: Kragh, U. & Smith, G. (Eds.). **Percept-Genetic Analysis**. Lund: Gleerups, 1970, 199-205.
- Kragh, U. Rekonstruktion verschiedener Aspekte einer Persönlichkeitsentwicklung mit dem Defense-Mechanism-Test: Eine Fallbeschreibung. In: Hentschel, U. & Smith, G. (Hrsg.) **Experimentelle Persönlichkeitspsychologie**. Wiesbaden: Akademische Verlagsgesellschaft, 1980, 107-130.
- Kragh, U. Studying effects of psychotherapy by the Defense Mechanism Test – Two case illustrations. **Archiv für Psychologie**, 1983, 135, 73-82.
- Nilsson, A. Application of a percept-genetic approach to separation and oedipal conflict problems in primitive-hysteria and obsessive-compulsive neurosis. **Archiv für Psychologie**, 1983, 135, 135-148.
- Rydén, O. & Danielsson, A. Personality of grossly obese surgical patients – a preoperative study. **Archiv für Psychologie**, 1983, 135, 115-134.
- Smith, G.J.W. & Nyman E. A serial, tachistoscopic experiment and its clinical application. **Acta Psychologica**, 1961, 18, 67-84.
- von der Lippe, A. & Torgersen, S. Character and defense: Relationships between oral, obsessive and hysterical character traits and defense mechanisms. **Scandinavian Journal of Psychology**, 1984, 25, 258-264.